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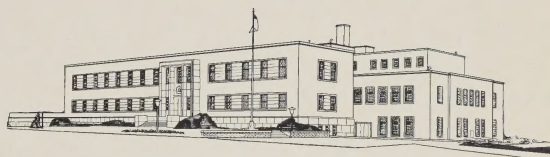
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laboratory, Vancouver laboratory.
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Government
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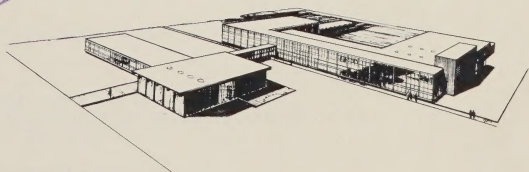
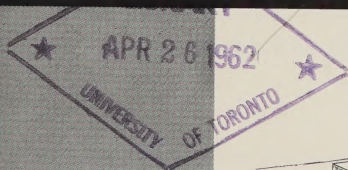
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OTTAWA LABORATORY

FOREST PRODUCTS RESEARCH BRANCH

DEPARTMENT OF FORESTRY
CANADA



VANCOUVER LABORATORY

Issued under the authority of
The Honourable Hugh John Flemming, P.C., M.P.,
Minister of Forestry

ROGER DUHAMEL, F.R.S.C.
QUEEN'S PRINTER AND CONTROLLER OF STATIONERY
OTTAWA, 1962

Cat. No. Fo 42-3061

Work of the Forest Products Research Branch is directed to the more efficient utilization of wood and the reduction of waste, thereby aiding in the continued advancement of Canada's forest industries.

Branch Laboratories, located at Ottawa and Vancouver respectively, perform research studies covering the mechanical, physical and chemical properties of Canadian woods; the development of new and better uses for wood products; and improved manufacturing techniques.

The results of FPRB research are available to the thousands of plants comprising the timber manufacturing and wood-using industries to further the economic utilization of Canada's great national heritage—the forests.

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INTRODUCTION

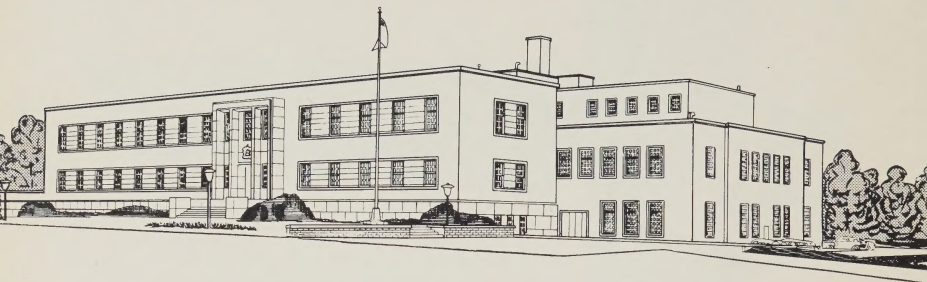
Main entrance to the new Ottawa Laboratory.
Administrative headquarters of the FPRB are also
located in this building.

The Forest Products Research Branch undertakes fundamental and applied research in the forest products field through research laboratories located in Ottawa and Vancouver. It is the results of these studies which provide the scientific and technical knowledge and data so essential to an informed development of our forest-based industries as well as for continued improvement of our manufacturing processes and the production of satisfactory end-products. Branch Headquarters, located in Ottawa, direct the research program to serve broad national needs, since problems in the forest products and utilization fields are seldom related to provincial boundaries. Close co-operation with the wood-processing industries and the forest services of the provinces ensures that research findings are of maximum benefit to the national economy. The following paragraphs describe briefly the history of the formation and growth of the Branch.

In 1913, an acute awareness of the need for scientific data on forest products provided the incentive to form a Canadian forest products research organization. In co-operation with McGill University, the first research laboratory was established and housed on the University campus in Montreal. For some years, particularly because the impact of World War I made the recruiting of staff difficult, development was handicapped and expansion was slow. However, increased demands for wood for defence purposes, together with increased rigidity of specifications, became important factors in the constantly growing volume of requests for test data on the properties of various wood species. Aircraft development, which entailed the use of considerable quantities of high-grade Sitka spruce, as well as the rapidly expanding markets for Douglas fir and other West Coast timbers were essential factors in the decision to establish, in 1917, a regional laboratory on the campus of the University of British Columbia, in Vancouver.

The expansion of research, addition of test and laboratory equipment, and an increasing staff of research personnel made it necessary to find larger quarters for the Montreal Laboratory. In 1927, this Laboratory and its facilities, with the exception of the pulp and paper unit, were moved to more adequate accommodation located in Ottawa.

Research activities of the FPRB continued to advance and expand so rapidly that, in April 1958, the Branch and its two Laboratories moved into modern-type buildings erected by the Department of Public Works. These new laboratory buildings, specially designed for the complex functions of forest products research, provided the much needed spaciousness that had been lacking in former quarters.



THE OTTAWA LABORATORY

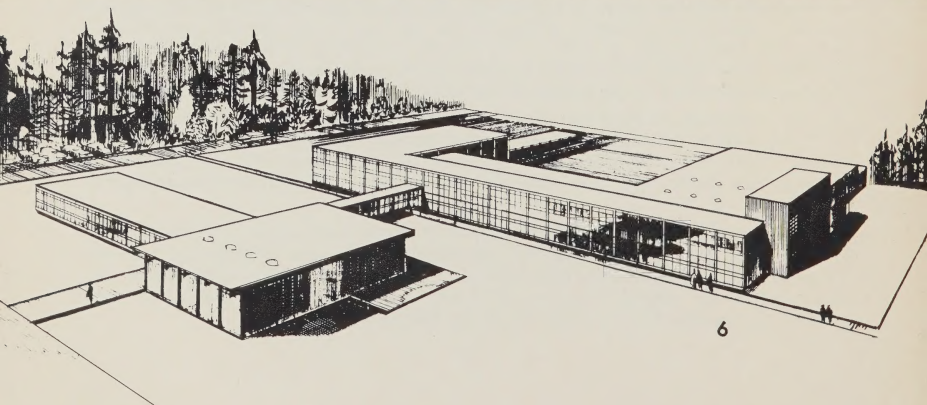
▲ LOCATED ON MONTREAL ROAD ON THE EASTERN OUTSKIRTS OF OTTAWA, ONTARIO.

The new building of the Ottawa Laboratory was occupied in April, 1958, and has a floor space area of 109,000 square feet in its three- and four-floor levels.

THE VANCOUVER LABORATORY

▼ LOCATED ON MARINE DRIVE, CAMPUS OF THE UNIVERSITY OF BRITISH COLUMBIA, VANCOUVER, B.C.

The new building of the Vancouver Laboratory was occupied in April, 1958, and has a floor space area of about 44,000 square feet in its one- and two-floor levels.



FIELDS OF ACTIVITY

Research concerning forest products falls into two broad classifications—fundamental and applied. Fundamental research provides the essential basic data on the mechanical, physical, chemical, and anatomical properties of Canadian woods. Applied research is directed toward the development of new and better uses for wood, improved practices, and a more complete utilization of the wood substance available from the annual timber cut. In addition to the research that is carried out within the Laboratories, the staff undertakes numerous studies and investigations in the field. These start in the forest, to determine the effectiveness of processes and methods of harvesting timber, and follow through to industrial operations in conversion plants.

The activities of the Laboratories at Ottawa and Vancouver are generally similar, with the work at Vancouver pertaining mainly to problems connected with timber species and forest products industries of British Columbia and western Alberta. Several additional phases of research are concentrated at the larger Ottawa Laboratory. Activities and programs are carefully integrated and controlled so as to be of maximum efficiency from a national viewpoint.

Both Laboratories are staffed and equipped for work in all the principal phases of research pertaining to wood and its uses, including work in the wood chemistry field not related to the manufacture of paper*, but including research on the production of pulps for the manufacture of wallboard and other pulp products.

The Program of Work, published annually, indicates the scope and variety of the research carried out by the FPRB. This overall program of research at the two Laboratories provides the basic planning and co-ordination for all studies and investigations. Average work during recent years has been classified under some 175 project headings annually.

*Pulp and paper research is carried out by the Pulp and Paper Research Institute of Canada, Montreal, P.Q. This Institute is a non-profit corporation and its management is vested in a Board of Directors comprising representatives of the Pulp and Paper Association, McGill University, and the Canadian Government.

A laboratory field study group investigates modern yarding techniques used in harvesting timber.

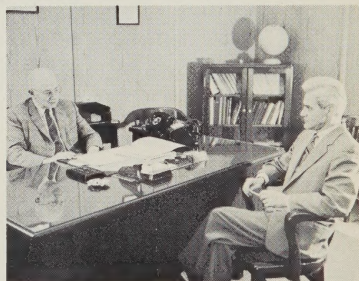




The natural beauty of Canadian Yellow Birch is distinctively displayed in the spacious lobby of the Ottawa Laboratory. Pleasant contrasts are presented through the use of dark-toned panelling outlined with light-toned trim in butternut finish. The winding stairway leads to the library and assembly hall.



A carefully selected library provides background information and knowledge of the work of other forest research organizations as well as essential reference material.



Canadian red oak with light-tone finish is used for the wall panelling in the office of the Director of the Forest Products Research Branch.

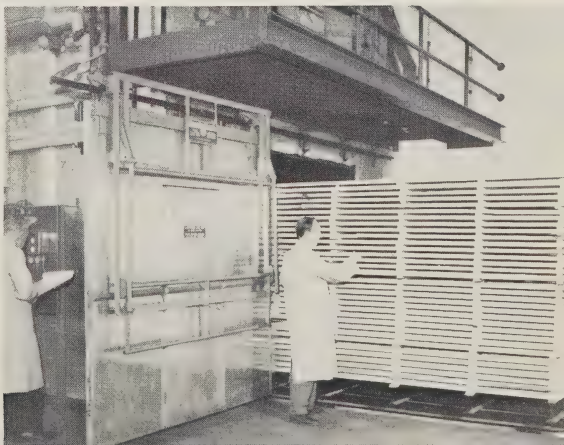
CO-OPERATIVE FUNCTIONS

Close relationship with the forest products industries and the large users of timber is maintained to keep applied research in balance with the requirements of industry. In this connection assistance is received from an Advisory Committee, comprising members representing various timber manufacturers and wood-using groups, which meets periodically to discuss the research requirements of industry.

There is constant co-operation with various government units in the performance of many special research investigations concerned with the use of wood. Research into the use of wood in housing construction and as an engineered material continues as an important activity that is undertaken in close co-operation with the Division of Building Research, National Research Council, and the Central Mortgage and Housing Corporation. The FPRB undertakes the role of technical adviser to the latter organization in matters pertaining to wood, and to conduct tests on new wood products developed for use in housing. In co-operation with the Division of Building Research, the FPRB continues to be active in bringing an engineering approach to the use of wood generally, but more specifically to the design of the many wooden components of one- and two-family dwellings, with special reference to panel walls and to glued and nailed wooden-truss roofs.

Technical information is supplied in response to large numbers of inquiries received by personal calls and by mail—from manufacturers and users of all forms of wood products. From time to time, special investigations are carried out into industrial problems, where it is considered that the results obtained would be of general value in any particular field of industrial production.

Many of the kiln-drying schedules used in today's commercial lumber seasoning have been developed through research conducted at the Laboratories on the kiln-drying of lumber.





The decorative beauty of a wide variety of British Columbia woods is displayed in the Administration Wing of the Vancouver Laboratory. Of particular interest is the fact that the finish of each room in the wing is representative of a different treatment and kind of wood. This interesting blending of wood surfaces—rotary cut veneers, sliced veneers, and planed lumber—is further accentuated in the subdued but bright and cheerful natural finishes which enhance the grain and texture of each species.



The lobby of the Vancouver Laboratory, with background showing the reception desk together with a mural treatment of photographs pertaining to forest products research.



The several elevations of the building, plus the harmonious use of western red cedar, vertical siding, porcelain, and clear finished birch panels, give it a pleasing and distinctive appearance.

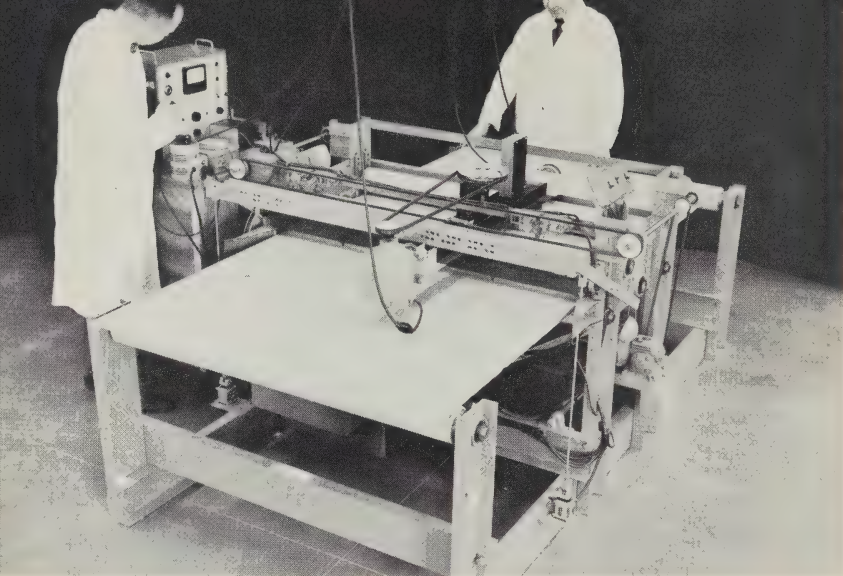
Another important feature of the work of the FPRB is the contribution made by its members while serving on technical committees. These include the Associate and Technical Committee of the National Building Code, and the Specification Committees of the Canadian Standards Association for such items as engineered design in timber, laminated construction, plywood, shingles, millwork, poles and piling, preservative treatments, protective packaging and containers. Branch personnel serve on such international committees as those of the American Wood Preservers' Association, American Society for Testing Materials, and the Food and Agriculture Organization of the United Nations. Staff members are also active on technical committees of various trade and research associations. Such participation ensures that technical advice and information resulting from forest products research is made available to specification-writing committees, and that important gaps in scientific knowledge are pointed out where urgent research is required.

The utilization of sawmill residue for pulp continues to show encouraging progress. The FPRB has been active in this field for a number of years, and in addition to carrying out research on the barking, chipping and transporting of the mill residue, it has organized and provided the secretariat for a committee whose membership is representative of lumber and pulp-mill operators and provincial organizations. Since the utilization of sawmill residue for pulp is so well developed on the British Columbia coast, this committee has concerned itself mainly with the other regions of Canada. Tangible results have been noted, and the annual volume of sawmill residue going into pulp in Eastern Canada has increased about tenfold in the past decade.

It is to be noted that forest products research laboratories are also active in many other countries. Continuous collaboration is maintained with these institutions for the dual purpose of exchanging information and avoiding unnecessary duplication of research. Consequently, the accumulated knowledge emanating from these many institutions, so vital to progress, is made available to the Canadian timber industry.

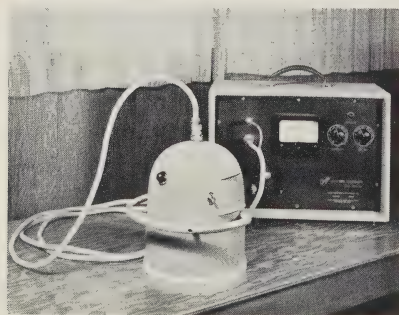
Conference rooms of the FPRB are made available to, and are used frequently by, various committees associated with forest products.





NEW DEVELOPMENTS — THE RESULTS OF APPLIED RESEARCH

A recent achievement in forest products research has been the development of a sonic flaw detector, a new device for detecting hidden blisters, voids or defective glue bonds in panels of plywood, hardboard, and other multi-layer materials. This successful development followed two years of research by personnel of the Plywood and Physics Section of the Ottawa Laboratory. Special acoustical research equipment required for the study was made available through the co-operation of the National Research Council. The development has been patented in Canada and further patents have been applied for in many other countries. A Canadian firm has leased manufacturing rights to produce both production line and portable models of the flaw detector. The new device, a result of applied research, is expected to be of considerable assistance to industry in quality control and inspection programs.



FROM THE IDEATO COMMERCIAL MODELS

Illustrated is a portable flaw detector for inspecting small panels. Other commercial models are designed for the high-speed inspection of large plywood panels.

RESEARCH PROGRAM

Research activities of the Ottawa and Vancouver Laboratories are generally similar, although the work at Vancouver inclines primarily to the British Columbia and Alberta species. Research programs of both Laboratories are carefully integrated to avoid unnecessary duplication. The following is an outline of the types of investigations which have been, or are being, undertaken by the FPRB. Research activities common to both Laboratories are listed under the heading "Research at both Ottawa and Vancouver Laboratories", while work centralized at the Ottawa Laboratory is shown under "Research at the Ottawa Laboratory only".

RESEARCH AT BOTH OTTAWA AND VANCOUVER LABORATORIES

TIMBER ENGINEERING

Determination of the mechanical and physical properties of Canadian woods and wood products—including the calculation of basic working stresses.

Research on structural timbers, glulam and other forms of wood structures with a view to improving the engineered use of timber.

Studies on strength of power and communication poles.

Evaluations of wood fastenings.

In the Structures Laboratory, strength and deflection characteristics of full size structural components such as beams, roof trusses, laminated members, poles, etcetera, are determined and evaluated.

Foreground—racking test.

Background—universal testing machine, 200,000 pound capacity.



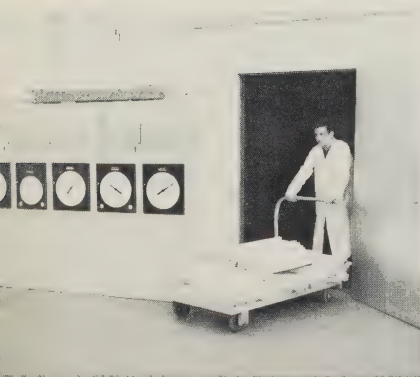
ORGANIZATION OF THE FORES

The FPRB comprises a Branch Headquarters, with Research Laboratories located at Ottawa and Vancouver. Branch Headquarters at Ottawa are responsible for the planning of research, the policy and preparation of publications, Industrial Liaison Service activities, and for liaison with both national and international bodies concerned with forest products research. Forming part of the Branch Headquarters are two sections:

- (a) *Technical Information Service*—disseminates technical information in the forest products field embracing research developments and findings of the Branch Laboratories, together with selected foreign research considered suitable for application to Canadian conditions. Information is so prepared as to be of interest to, and usable by, the thousands of plants comprising the timber manufacturing and wood-using industries throughout Canada.
- (b) *Industrial Liaison Service*—comprises suitably located field representatives who visit sawmill and other wood-working plants in their respective regions to keep industry aware of research developments and technical advances which may assist in the solution of industrial problems. The field representatives also undertake liaison duties to keep the Laboratories informed of field problems in which research studies would be of value.

PERSONNEL

| <i>Continuing Positions</i> | <i>Branch H.Q.</i> | <i>Ottawa Lab.</i> | <i>Vancouver Lab.</i> | <i>Total</i> |
|--------------------------------|------------------------|------------------------|---------------------------|--------------|
| Professional (graduates)..... | 6 | 45 | 23 | 74 |
| Technicians and tradesmen..... | 3 | 38 | 23 | 64 |
| Clerical..... | 7 | 13 | 8 | 28 |
| <i>Seasonal Positions</i> | | | | |
| Graduates..... | — | 5 | 2 | 7 |
| Undergraduates..... | — | 16 | 7 | 23 |
| Total Positions (1961-62)..... | 16 | 117 | 63 | 196 |



Variable temperature and humidity chambers are required for conditioning specimens used in research to any desired moisture content.



The microscopic structure of any wood species can be permanently recorded by the wood anatomist using the modern microscope and photographic attachment shown above.

PRODUCTS RESEARCH BRANCH

ORGANIZATION CHART

BRANCH HEADQUARTERS

Director—J. H. JENKINS

INDUSTRIAL LIAISON SERVICE

TECHNICAL INFORMATION SERVICE

OTTAWA LABORATORY

Superintendent—H. SCHWARTZ

VANCOUVER LABORATORY

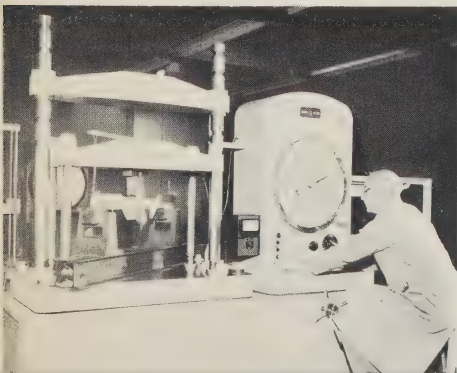
Superintendent—K. G. FENSOM

Research in:

- TIMBER ENGINEERING
- WOOD PATHOLOGY
- PLYWOOD
- WOOD ANATOMY
- WOOD PRESERVATION
- CONTAINERS
- LOGGING AND MILLING
- PAINTS AND COATINGS
- SEASONING
- MICROBIOLOGY
- WOOD CHEMISTRY
- TIMBER PHYSICS

Research in:

- TIMBER ENGINEERING
- PLYWOOD
- WOOD PRESERVATION
- LOGGING AND MILLING
- SEASONING
- WOOD CHEMISTRY
- WOOD PATHOLOGY
- WOOD ANATOMY



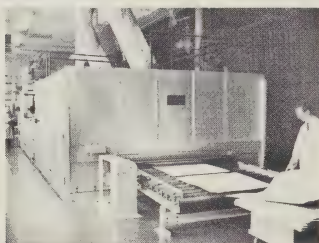
Universal testing machine, 60,000 pound capacity, being used to perform a static bending test—one of several tests employed in determining the mechanical strength of wood.



Accelerated weathering tests are conducted in the Weatherometer to evaluate the durability of wood specimens, adhesives, paints and other finishes.



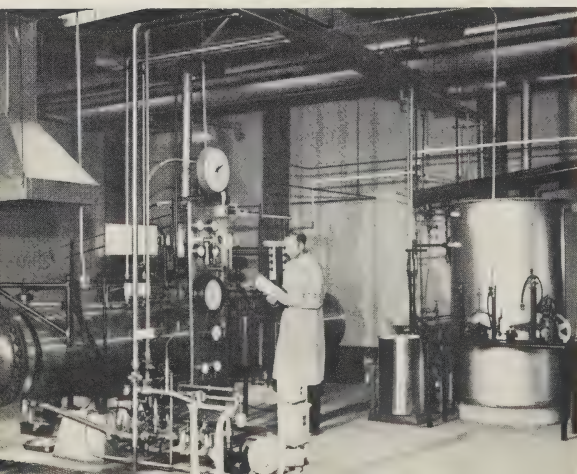
Veneer lathe, reeler and clipper are employed in research on the manufacture of veneers and plywoods. Techniques are developed for the utilization of new species for plywood production.



A three-section, single deck veneer dryer, with special instrumentation and controls, is used for studying problems associated with the drying of veneers.



The electronic testing machine, right, is a key instrument used in wood adhesives research requiring strength tests on thousands of glued wood samples.



An experimental pressure retort with instrumentation in the Wood Preservation Unit. Treating methods and preservatives are evaluated for effectiveness in protecting wood from decay and borer attack.

PLYWOOD

Research on the various factors affecting the manufacture of softwood and hardwood plywood—including peeling of the log into veneer, veneer drying, and gluing.

Studies of the mechanical and physical properties of plywood.

Determination of the suitability of various species for the manufacture of veneer and plywood and the determination of satisfactory manufacturing techniques for new species.

Determination of the properties and use techniques of adhesives for the manufacture of plywood and glued-laminated timbers.

WOOD PRESERVATION

Research into the treatment of wood with preservatives by pressure and non-pressure methods, including the development of new treating schedules and the application of statistical methods of evaluating preservatives.

Studies of the mechanism of the movement of liquids into wood and the development of mathematical formulae indicative of relationships between treating variables.

Records of service installations and conduct of soil-block tests for evaluation of preservatives.

LOGGING AND MILLING

Studies on the harvesting and manufacture of trees into lumber and on other primary manufacturing processes and equipment, with a view to more efficient utilization.

Research into possible conversion to economic use of wood material now discarded.

WOOD SEASONING

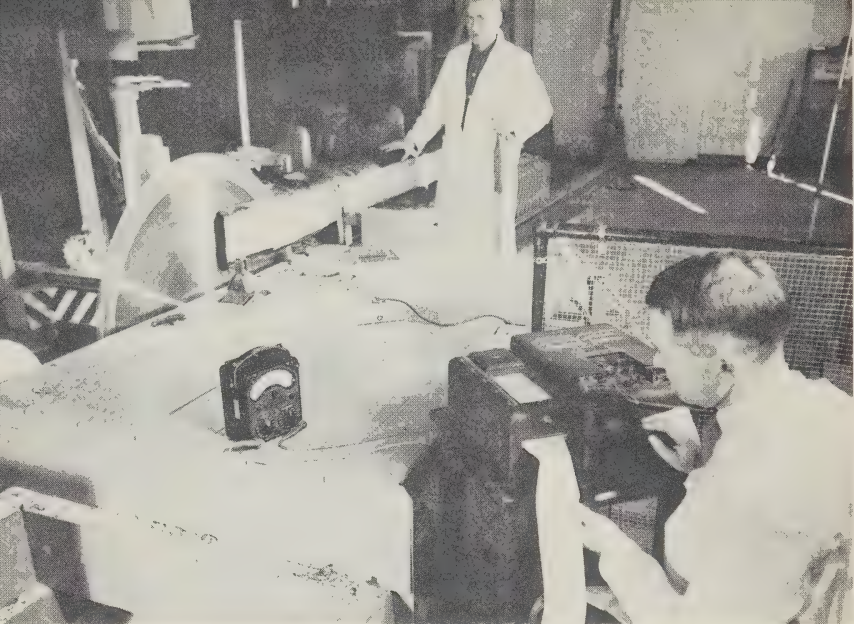
Research into the theory and techniques of lumber seasoning (air- and kiln-drying).

Studies of seasoning practices in industry aimed at developing improved methods of drying, including the preparation of efficient drying schedules.

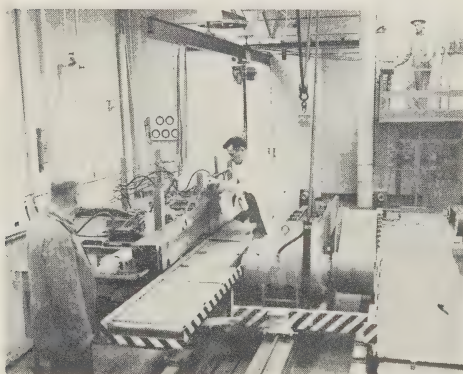
Educational courses to assist in industrial application of research findings.

Microtome (right) for cutting thin sections of wood which, under microscopic examination, reveal cell structure for identification of species and other research data.





Canada's only Research Sawmill is located in the Ottawa Laboratory, FPRB. This "circular headrig" mill is highly instrumented for obtaining basic operating data on saw power requirements, effect of saw speeds and feeds, design of saw blades and saw teeth, and other factors involved in the conversion of logs into lumber. Studies of improved methods of sawing are pursued in conjunction with research aimed at improving sawmill machinery, and increasing mill efficiency and output. Information of this nature, as well as data obtained in field studies, is brought to the attention of mill owners, and others interested in lumber production, through various publications and specially prepared FPRB courses entitled IMPROVED SAWMILL PRACTICES.



FPRB explores the possibilities of radical design changes in sawmill equipment. Completely operational from a research standpoint and for study purposes, the experimental sawmill at the left features a travelling headsaw, remote control station, and hydraulic control of stationary log carriage.

WOOD CHEMISTRY

Determination of the chemical properties of Canadian woods and of the main components such as lignin, cellulose and extractives.

Studies of the dimensional stabilization of wood by chemical modification and of new methods for delignification of wood and wood residues.

Evaluation of various types of mill residue for production of structural boards and other forms of utilization.

WOOD PATHOLOGY

Research into the effect of fungi on the properties of wood and wood products and of means of control.

Identification of wood-destroying fungi and assessment of the cause and significance of the various decays.

Investigation of the tolerance of fungi to toxic chemicals and the determination of the fungicidal properties of wood extractives.

WOOD ANATOMY

Research on the effect of anatomical structure on wood properties and behaviour.

Microscopic identification of woods and wood structure.

RESEARCH AT THE OTTAWA LABORATORY ONLY

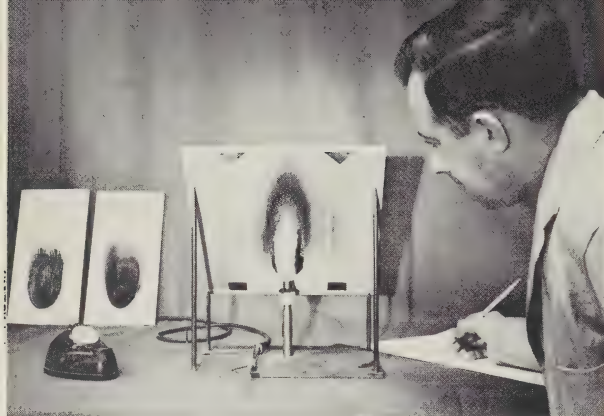
CONTAINERS

Investigation of the various factors involved in the design and use of boxes, crates and other containers.

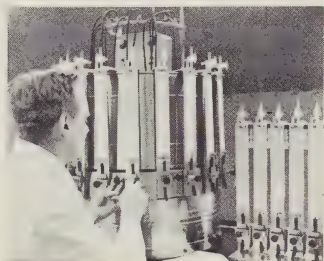
Improvement of standards of packing for shipment and for reducing damage in transit.

The Container Laboratory contributes engineering data on matters pertaining to design, construction, and use of protective packaging involving wood and wood products.





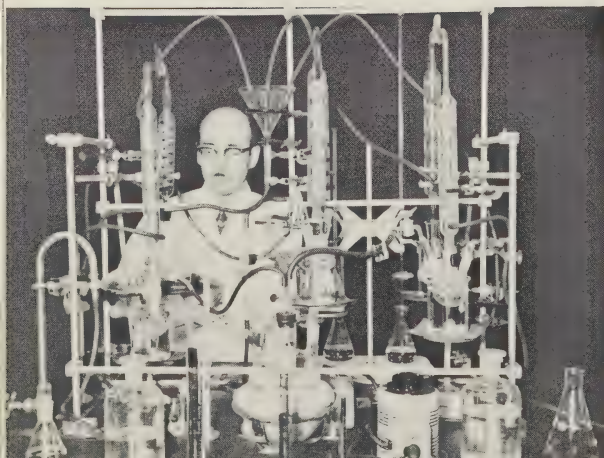
Research in the paints and coatings field includes the evaluation of fire-retardant coatings on wood.



In the field of microbiology, breakdown of sawdust by bacterial fermentation is being studied for the purpose of producing useful organic chemicals.



Research in dielectric heating and its uses in wood gluing results in valuable technical information for the Canadian wood-working industry.



FPRB chemists constantly conduct research into the components of Canadian woods with characteristics that influence the final utilization of the species.

PAINTS and COATINGS

Research into the various factors affecting the painting of wood, including such variables as moisture, knots and resin.

Studies of the durability and general performance of paints and natural finishes on wood under a variety of conditions.

Research on fire-retardant coatings and their effect on the properties of wood.

MICROBIOLOGY

Studies of the micro-organisms that decompose wood and of the possibilities of utilizing wood waste through the medium of microbial action.

MILLING—

RESEARCH SAWMILL

In the Ottawa Laboratory research sawmill, fundamentals of lumber manufacture are studied, including the effect of variables and modification of saw design on power requirements, kerf and efficiency of sawing.

Short courses are presented to industry on improved sawmill practices to assist in the industrial application of research findings.

TIMBER PHYSICS

Applications of the principles and techniques of modern physics to forest products research, involving basic research on intermolecular forces acting in wood moisture relationships, and applied research on the various physical properties of wood and the influences of various factors on these properties.

Application of dielectric heating in the wood-working industries, and investigation of dielectric properties of wood and resin glues.

Development of non-destructive methods of testing wood and wood products.

Wood pathologists isolate and identify wood-decaying fungi; study their effects on wood serviceability; conditions under which they develop, and methods of control.



CANADA
Department of Forestry

FIRE-RETARDANT TREATMENT OF WOOD

by
H. F. MARRAS

FOREST PRODUCTS LABORATORIES OF CANADA

MANUFACTURING OF LUMBER
IN EASTERN CANADA

W. A. MILLER
Ottawa Laboratories

TOLERANCE
A WATER-SOLUBLE
AND ITS

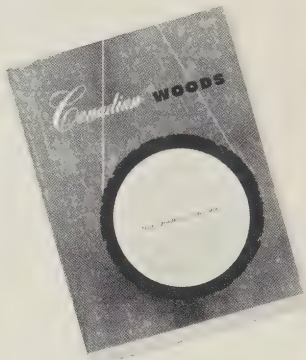
FOREST PRODUCTS LABORATORIES OF CANADA

CANADA
Department of Forestry

Effect of Solutions of Nitrogen Dioxide,
Sulphur Dioxide, Hydrogen Sulphide, and
Chlorine in Dimethylformamide and
Dimethylsulphoxide on Wood

A. F. GORMAN and F. BAKER

FOREST PRODUCTS LABORATORIES OF CANADA



367 PAGES
329 ILLUSTRATIONS

CANADIAN WOODS gives a graphic picture of the principal processes used in Canada's huge forest products industry, from the tree in the woods to the final product. This publication is available from the Queen's Printer, Ottawa, at \$3.00 a copy. Other publications of the FPRB are obtainable on request from either the Ottawa or Vancouver Laboratories.

WOOD SEASONING

Technical Note No. 20

CANADA
Department of Forestry

SOME EFFECTS OF MILL TYPE ON
THE SAWING OF SMALL LOGS

by
T. F. MARRAS

FOREST PRODUCTS LABORATORIES OF CANADA

LA SCIE PRINCIPALE

PROPERTIES AND UTILIZATION
OF CANADIAN PORTERS

by
J. D. MARRAS and J. C. MARRAS

Technical Note No. 21

FOREST PRODUCTS LABORATORIES OF CANADA

CANADA

Ministère des Forêts

LA PRODUCTION DU CHARBON
DE BOIS AU CANADA

by
H. CANTIN

Canada
MINISTÈRE DU BOIS, DU CHARBON ET DES RÉSOURCES NATURELLES
DIRECTION DES BOIS

CANADA

LA SCIE PRINCIPALE

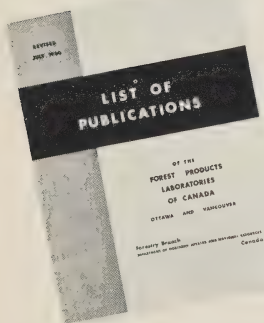
NUMEROUS PUBLICATIONS COVERING THE RESEARCH ACTIVITIES AND FINDINGS OF THE BRANCH AND LABORATORIES ARE AVAILABLE ON REQUEST

DISSEMINATION OF INFORMATION

The FPRB has long realized that research findings are of little, if any, practical economic benefit to the nation unless they are accepted by industry and applied to industrial practices. For this reason, a great deal of attention is devoted to the dissemination of research findings through such means as:

- (a) Publications
- (b) Exhibits
- (c) Technical Courses
- (d) Answering Technical Enquiries
- (e) Industrial Liaison Service

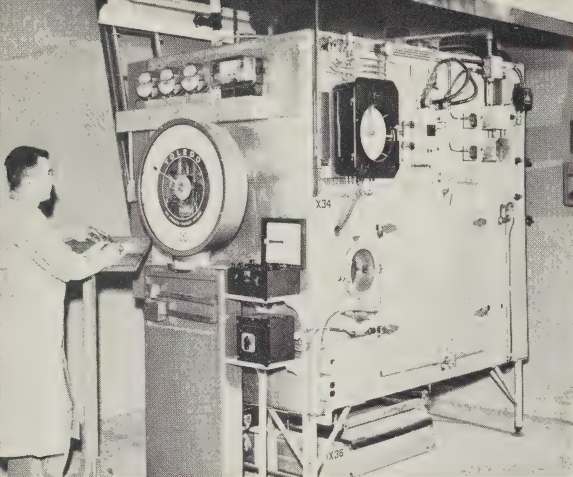
(a) PUBLICATIONS



Research findings of the Laboratories are made available in various types of publications including bulletins, technical notes and reports, reprints of articles written for technical and trade journals, and in papers delivered to scientific and industrial groups. Information covering the numerous publications of the FPRB can be obtained from the LIST OF PUBLICATIONS issued annually and available on request. The FPRB news-letter entitled RESEARCH NEWS is published bi-monthly and briefly describes interesting aspects and findings of current work, along with other general items of interest to the wood-using industries.

(b) EXHIBITS

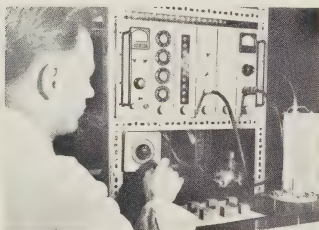
A continuing program of the FPRB is the design and construction of special exhibit material showing the research undertaken by the Laboratories and the close relationship between forest products research and improved utilization practices. Such exhibits are used at the Laboratories to present research information to visitors—especially visiting groups requiring special demonstrations of some particular phase of the research work. In addition, other specialized exhibits are designed from time to time in connection with meetings and conferences of industrial and scientific organizations.



An experimental high-temperature dry-kiln used for drying wood in temperatures above the boiling point of water in order to develop faster drying schedules.



An FPRB chemist developed a heavy-paper chromatographic technique—an improved preparative tool for wood chemistry research.



Wood preservative penetration is studied with the help of radioactive tracers that can be detected with the counting equipment shown.



Exterior exposure areas are used for long term weathering to evaluate wood specimens, adhesives, paints and other finishes.

(c) TECHNICAL COURSES

The value of research in the forest products field must always, in the final analysis, reside in the widespread application of its findings by the industrial enterprises to which they apply. FPRB participation in technical courses has proved to be a most effective medium for disseminating research findings direct to key personnel of industry. Experience has shown that LUMBER SEASONING COURSES, given for a number of years, have brought about many beneficial results to those who attended, with a resultant improvement in lumber seasoning practices. Similar results are being obtained from a more recently initiated course, IMPROVED SAWMILLING TECHNIQUES, related to the satisfactory operation of "circular headrig" mills and based largely on information obtained from studies at the FPRB Research Sawmill and at co-operating commercial sawmills. This course has found such favour with industry across the country that numerous requests for future courses are being received. However, the number of courses that can be presented are of necessity governed by the limited time available to the staff normally engaged in research duties. The close co-operation of the Provincial Forest Services, Lumber Associations and Industry, has contributed greatly to the successful presentation of these courses.

(d) TECHNICAL ENQUIRIES

The FPRB is an important data centre for information on Canadian woods. Research through the years has resulted in large stores of technical and specific data on the physical and mechanical properties of commercial timbers of Canada. As a result, technical personnel of the Laboratories assist many important committees dealing with the preparation of national STANDARDS AND SPECIFICATIONS for a wide range of wood products.

Thousands of enquiries are received annually by mail, telephone, and from visitors to the Laboratories, requesting data or assistance on technical problems associated with the use of wood. In most cases, information can be prepared from data on record, but in some instances, replying to an enquiry may necessitate additional minor investigations. These important activities of the Branch play a significant part in economic forest utilization, industrial progress and the production of better consumer goods.

(e) INDUSTRIAL LIAISON SERVICE

The recently established Industrial Liaison Service is proving to be an important aid in disseminating the findings of forest products research.

FPRB field representatives, with broad training in the field of forest products, travel widely in their assigned areas to advise industrial personnel—or obtain information for them from the Laboratories—on wood utilization problems. Periodically these representatives return to the Laboratories to review the latest research developments and findings, as well as to hold comprehensive discussions with FPRB personnel regarding the type of information needed in their territories. This close contact with industry assists in establishing Laboratory research programs to help solve specific regional and industrial problems.

VISITORS WELCOME

The Ottawa and Vancouver Laboratories welcome visitors and are pleased to arrange tours on request.

THE FUTURE

While the results achieved to date have provided an impressive record of knowledge on the properties and uses of Canadian wood species, it is realized that industrial developments in many other fields will continue to present acute competition to our forest industries. Therefore the economic well-being of Canada's forest-based industries is ever more dependent on research. It is this research that will provide the basis upon which to orient the development necessary to assure the production of wood products acceptable to the buyer and also competitive in their respective fields.

It is the aim of the FPRB to continue to work in partnership with the forest products industries so that, aware of their needs, it can co-operate in finding solutions to technical problems as well as to assess and evaluate new methods, processes and equipment. These considerations are always before those who plan the program of research of the Branch, so that in all areas of activities, there will be available all possible research knowledge, to assist our forest-based industries to develop and maintain their economic stability and to continue to provide an ever-increasing quantity of products for our home population and our customers abroad. It is believed that the forest products industries are best served in this manner, and that long-term and continuing benefits to the national economy will be of optimum value.

Vibrational properties of wood are being investigated in connection with the development of non-destructive methods for determining the strength characteristics of wood.

